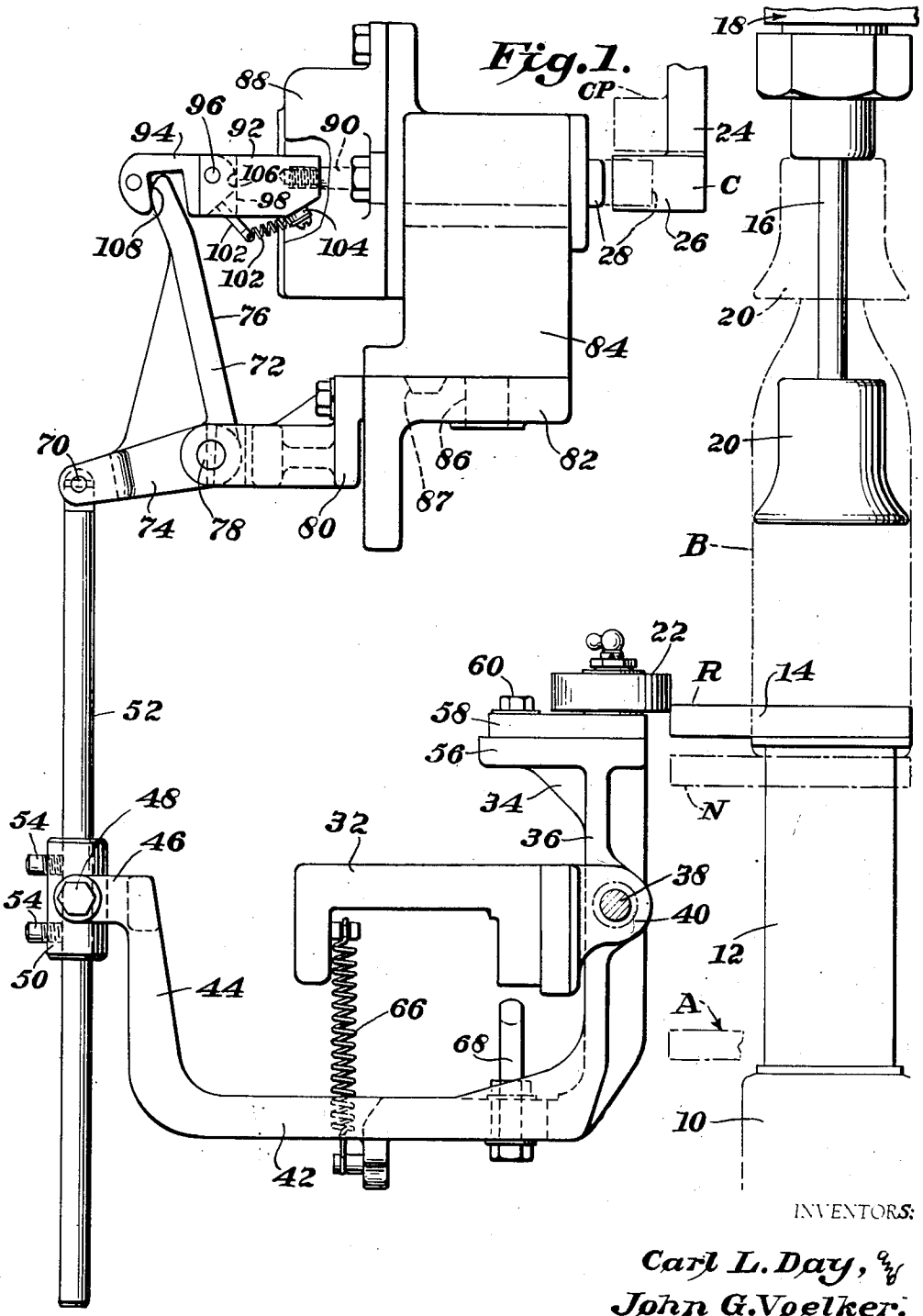
March 5, 1957 C. L. DAY ET AL 2,783,787

VALVE TRIP CONTROLLING MECHANISM FOR FILLING MACHINES

Filed Sept. 25, 1952 2 Sheets-Sheet 1

Fig. 1.



INVENTORS:

Carl L. Day,
John G. Voelker,

BY Cushman, Darby & Cushman
ATTORNEYS.

March 5, 1957 C. L. DAY ET AL 2,783,787

VALVE TRIP CONTROLLING MECHANISM FOR FILLING MACHINES

Filed Sept. 25, 1952 2 Sheets-Sheet 2

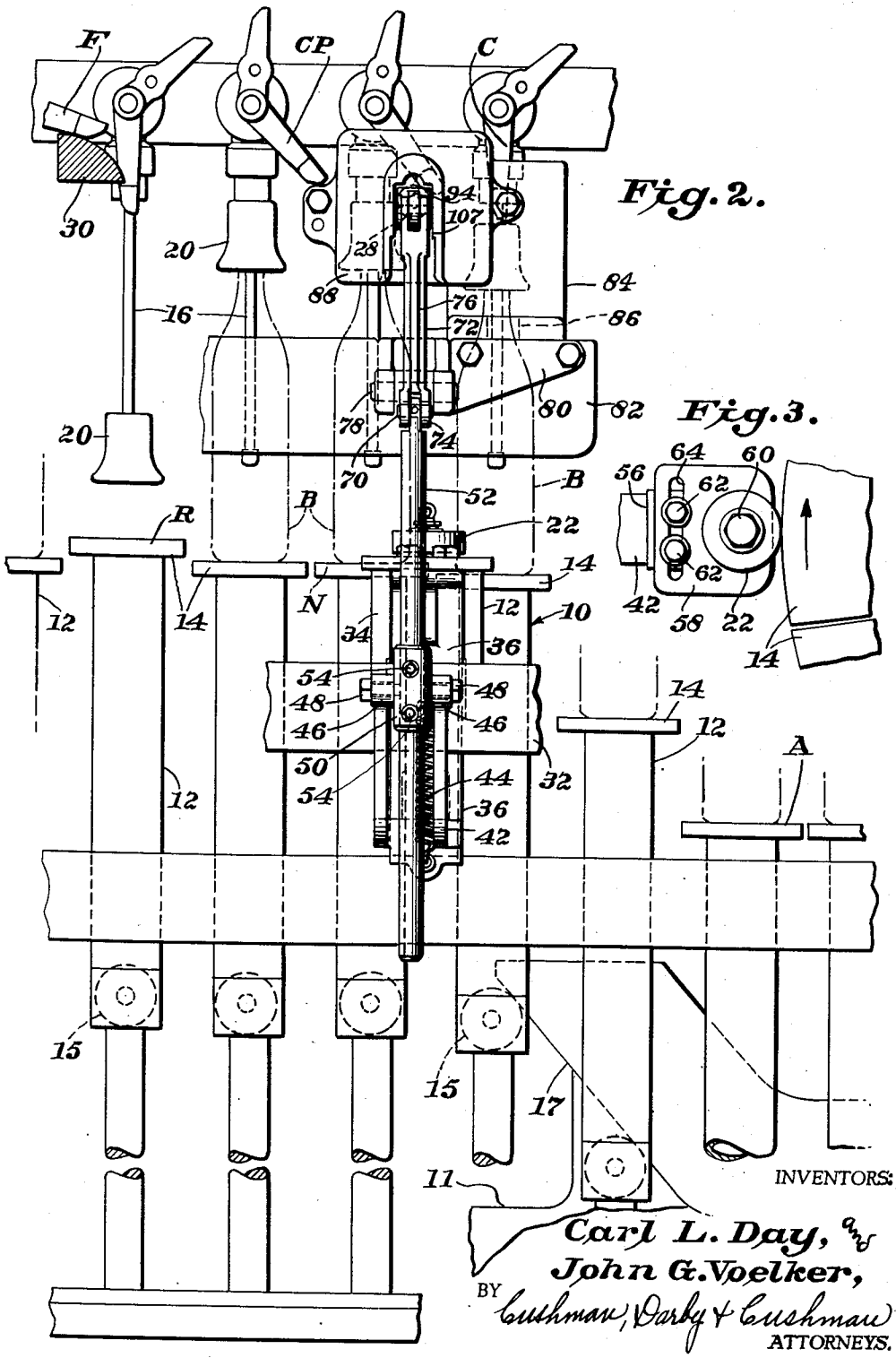


Fig. 2.

Fig. 3.

INVENTORS:
Carl L. Day,
John G. Voelker,
BY Cushman, Darby & Cushman
ATTORNEYS.

United States Patent Office 2,783,787 Patented Mar. 5, 1957

2,783,787

VALVE TRIP CONTROLLING MECHANISM FOR FILLING MACHINES

Carl L. Day and John G. Voelker, Baltimore, Md., assignors to Crown Cork & Seal Company, Inc., Baltimore, Md., a corporation of New York

Application September 25, 1952, Serial No. 311,502

10 Claims. (Cl. 141—141)

The present invention relates to valve trip controlling mechanisms for filling machines.

Filling machines of the type used to fill bottles or other containers with carbonated beverages, including beer, ordinarily are provided with some arrangement to prevent the filling head valve from operating in the event that no container is positioned beneath the filling head to receive the beverage. If the filling head is of the type including a rotary valve element first movable to cause counterpressure to be established in the container and then movable to cause flow of liquid to the container, it is usual to provide mechanism operable when no container is positioned beneath a filling head to retract the trip plunger which ordinarily moves the filling head valves to the counterpressure position. By this system, the operating arm and filling head valve will not be moved to counterpressure position but will remain in flow shut-off position. Therefore, when the filling head reaches the trip which ordinarily moves the valve from counterpressure position to filling or liquid flow position, its valve operating arm will not contact with the second or filling trip. In short, by retracting the counterpressure trip plunger when a filling head has no container aligned therewith, such filling head will be inoperative throughout the remainder of the normal filling cycle.

Huntley and Stewart Patent No. 2,145,765, issued January 31, 1939, Stewart and Gladfelter Patent No. 2,202,033, issued May 28, 1940, Stewart and Rever Patent No. 2,353,523, issued July 11, 1944 and Stewart and Bell Patent No. 2591,739, issued April 8, 1952, show various mechanisms intended to effect the control discussed above. However, it will be observed that each of the above mechanisms comprises a control including either electrical or compressed-air acutated devices. The provision of fluid pressure or electrical devices in the control mechanism has been found to unnecessarily complicate the mechanism. In other words, while almost all filling machines must be driven electrically and many such machines also require a connection to a source of compressed air, nevertheless, the inclusion of electrical or compressed air operated devices in the filling trip control adds an item of expense both in original cost and maintenance. We have found that an exceptionally efficient and durable filling trip control can be provided by having the control completely mechanical in its action.

An object of the invention is to provide a filling machine valve trip control mechanism which is of simple but efficient design and is purely mechanical in construction and operation.

Another object of the invention is to provide a mechanical valve trip controlling mechanism which readily can be applied to filling machines heretofore equipped with controls of the type disclosed in the four above-mentioned patents.

Another object of the invention is to provide a valve trip controlling mechanism which is readily adjustable to handle containers of various sizes.

If a filling machine has been operating to handle six-

ounce bottles and it is desired to operate it to handle bottles of a larger size, it is necessary to raise the filling table superstructure, that is, the reservoir and filling heads, to accommodate the taller bottles. Because the raising of the filling heads necessitates the corresponding raising of the filling head valve trips, it is necessary that the counterpressure trip controlling mechanism be such as to permit raising of that trip. When electrical or fluid pressure mechanisms are provided, such raising or lowering of the counterpressure trip can be accommodated by including flexible cable or hoses in the mechanism. Heretofore, the provision of a mechanical control readily adjustable for this purpose has involved certain difficulties which are overcome by the present invention.

Still another object of the invention is to provide filling machine valve trip control mechanism which readily can be rendered inoperative and as readily restored to operative condition.

The importance of the last-stated object will be apparent when it is realized that before a filling machine is operated to fill bottles with carbonated beverages, it frequently is desirable to rotate the filling machine for a short period of time to allow water to discharge through the filling valves but without bottles on the container supporting platforms. If the counterpressure trip controlling mechanism cannot be thrown out of operation, such trial runs cannot be accomplished. The present invention includes a very simple releasable connection to permit the counterpressure trip to be held in filling head actuating position even though no bottle is placed on the platforms beneath the filling heads.

A further object of the invention is to provide a mechanism of the type described including means whereby the counterpressure trip may swing out of the path of a seized filling head valve and without damaging the mechanical actuating connections.

Still another object of the invention is to provide a mechanism of the type described wherein the container platform engaging or detector device is of novel form and is readily adjustable with respect to the remainder of the mechanism to enable proper positioning of the detector device with respect to the container platforms.

Other objects and advantages of the invention will be apparent from the following specification and accompanying drawings.

In the drawings:

Figure 1 is a side elevation of the mechanism of the present invention, the view generally being taken in a plane radial of a rotary filling table and showing a container supporting platform and portions of the corresponding filling head and valve in association with the mechanism of the present invention.

Figure 2 is a view looking toward Figure 1 from the left of the latter figure, this view also diagrammatically indicating a number of container supporting platforms, valve arms and trips, and the platform controlling cam.

Figure 3 is a fragmentary top plan view illustrating the mounting of the platform engaging or detector roller.

Referring initially to Figure 1 of the drawings, the numeral **10** designates the rotary filling table of a filling machine of the type disclosed in the above-mentioned Huntley et al., and Stewart et al. patents, only a fragmentary peripheral portion of the filling table being shown. As is indicated in Figure 2 and as also appears in said patents, the filling table **10** will rotate with respect to the machine base **11** about a vertical axis and will be provided with a number of vertically movable container supporting elements, each comprising a plunger **12** vertically reciprocable in one of a plurality of bores formed in table **10** and each plunger having a platform **14** secured to its upper end and which platform supports a bottle or other container during its movement with the filling table.

As is described in said patents, the containers to be filled on a rotary filling machine enter the machine on a straight line conveyor and are moved from that conveyor by a rotary infeed dial or spider which positions successive containers B on the platforms **14** as shown in Figures 1 and 2. At that moment, the platform **14** will be in the lowered position A indicated in Figures 1 and 2. An instant after a platform **14** has moved past container receiving position, operation of the machine to carry the platforms to the left as viewed in Figure 2 will cause the roller **15** of each platform to be clear of a cam **17** fixed to the base of the machine so that the platform will be moved upwardly either by means of a spring or by means of fluid pressure within a manifold, all as described in said patents. If a platform **14** has received a container from the infeed dial, the raising of platform **14** will cause the container to move upwardly about the nozzle **16** depending from the filling head generally designated at **18** in Figure 1. During movement of the container upwardly about nozzle **16**, the mouth of the container will contact with a centering bell **20** vertically slidable upon the nozzle **16**, with the result that the bell **20** will be raised to the dotted line position indicated in Figure 1. The raising of the platform **14** will continue until the spring pressure or fluid pressure exerting the lifting force causes the mouth of the bottle to be firmly pressed against a sealing gasket within centering bell **20** and, in turn, presses the centering bell into sealed engagement with the body of the filling head **18**. The distance which platform **14** and plunger **12** may thus rise when a bottle is positioned thereon is indicated by the dotted line platform showing N of Figure 1 and the showings N of Figure 2. It will be noted from Figure 1 that a platform in position N will be below a detector roller or platform engaging member **22** forming part of the present invention and, therefore, the platform will not contact with roller **22**.

As is described in said patents and as is mentioned above, each of the container supporting platforms **14** will be in vertical alignment with a filling head **18**. Said patents further describe the filling heads as including a filling valve of rotary disk type including a depending generally radial arm **24** including an outwardly projecting striker lug **26**. Shortly after a platform **14** has been raised to position B of Figure 1, the rotation of the filling table **10** will cause the lug **26** of the depending valve operating arm **24** to move past the trip plunger **28** of the counterpressure trip mechanism. Because the platform **14** under discussion has received a bottle B and, therefore, only has risen to position N, such platform will not contact with roller **22**. Therefore, plunger **28** will be in the dotted line position of Figure 1, and will be struck by lug **26** of arm **24**, so that the arm will be rotated from the closed position indicated at C in Figure 2 to the counterpressure position CP indicated in the same figure and also shown in dotted lines in Figure 1. With the operating arm **24** moved to position CP, its disk valve will be in counterpressure flow position with the result that counterpressure gas will flow through filling head **18** to establish counterpressure in container B. The platform **14** and filling head **18** under discussion next will move adjacent a filling trip **29** diagrammatically shown in Figure 2 with the result that the operating arm **24** will be moved from position CP of Figures 1 and 2 to filling or liquid flow position F of the latter figure.

All of the above assumes that a bottle B is placed upon a platform **14** as the latter moves past the container infeed dial. It will be observed that if the above cycle of operation of the filling head valve operating arm **24** should be carried out when no bottle is placed upon a platform **14**, a considerable waste of counterpressure gas would occur when operating arm **24** is moved to position CP of Figures 1 and 2. Furthermore, the movement of arm **24** from position CP to position F would result in a waste of carbonated water. The mechanism whereby the present invention avoids this waste of gas and carbonated water

is discussed below. However, in general, and as is explained in said Huntley et al. and Stewart et al. patents, if a platform **14** does not receive a container B from the infeed dial, the spring or fluid pressure acting on its plunger **12** will lift the platform to the solid line position R of Figures 1 and 2 because no bottle is present to limit such increased rise of the plunger and platform. In such case, the platform will strike detector roller **22** thereby causing trip plunger **28** to be retracted by the mechanism described below.

As is shown in the lower portions of Figures 1 and 2, a bracket **32** secured to the base or stationary portion of the filling machine alongside the path of travel of filling table **10** has a substantially U-shaped element, or first lever, **34** pivoted thereto. In more detail, element **34** includes an inner vertical leg **36** which is provided intermediate its length with a horizontal disposed pin **38**, the ends of the pin being journalled in spaced apertured lugs **40** extending inwardly from bracket **32**. Pin **38** thus serves as a pivot for element **34**.

At the lower end of leg **36** element **34** includes a horizontally extending portion or leg **42** and an outer vertical leg **44** extends upwardly from the outer end of leg **42**. At its upper end, leg **44** includes a pair of outwardly extending apertured bosses **46**. As is best shown in Figure 2, the bosses **46** are spaced apart laterally and have pivot pins **48** extending through their apertures, the inner ends of the pins being threaded in a collar **50** secured to a vertical link **52** by means of set screws **54**. The portions of the pins **48** extending through the bosses **46** are unthreaded to thereby provide a pivotal connection between element **34** and collar **50**.

It will be noted from Figure 2 that the outer vertical leg **44** of element **34** is offset to the left with respect to the inner vertical leg **36**, this positioning being due to the fact that the horizontal leg **42** is correspondingly angled or offset. As is also apparent from Figure 2, the detector roller **22** is generally centered with respect to the inner vertical leg **36** while the plunger **28** is generally centered with respect to the outer vertical leg **44**. Hence, the detector roller **22** will be actuated by a platform **14** an instant before the corresponding valve operating arm **24** comes adjacent plunger **28**. In other words, the slight angular offset of the horizontal leg **42** enables plunger **28** to be retracted by a platform **14** before the corresponding valve arm **24** reaches plunger **28**.

Referring again to the pivoted element **34**, the upper end **56** of the inner vertical leg **36** is of planar form. As is best shown in Figure 3, a plate **58** including a journal pin **60** for the detector roller **22** is adjustably mounted on planar end **56** by means of set screws **62** which extend through a slot **64** in plate **58** and into threaded sockets in portion **56**. The provision of this pin and slot connection of plate **58** to element **34** enables the position of roller **22** to be adjusted along the path of travel of the filling table. Thus, if the detector roller **22** is not contacted by a raised platform **14** soon enough to enable plunger **28** to be retracted in proper time, plate **58** may be moved downwardly as viewed in Figure 3 to thereby retract plunger **28** somewhat sooner. It will be understood that in Figure 3 the filling table is rotating in the direction of the arrow appearing in that figure.

A spring **66** extends between the horizontal leg **42** of element **34** and the bracket **32**, spring **66** thereby urging element **34** in a clockwise direction about its pivot **38**. A stop pin **68** adjustably threaded in horizontal leg **42** is adapted to contact with bracket **32** to limit this counterclockwise motion of element **34**. It will be understood that bracket **34** normally is inclined in a clockwise direction from the position illustrated in Figure 1, that figure showing the element **34** in the position to which it will be moved by a platform **14** which is not carrying a bottle.

Referring again to the link **52**, it will be noted that

the upper end of the link is pivotally connected by a horizontal pin 70 to a second lever or bell crank 72. As best shown in Figure 1, bell crank 72 includes a horizontal leg 74 connected to link 52 and a vertical arm 76 which extends upwardly. Bell crank 72 is pivoted at the angle between its arms and by means of a horizontal pin 78 to a fitting 80 secured to a bracket 82 supported on the stationary or base portion of the filling machine as disclosed in said patents, bracket 82 being above the bracket 32 which supports the element 34. Bracket 82 also supports an upstanding fitting 84 which is connected to bracket 82 by means of a vertical pivot generally indicated at 86. As is described in said patents, the pivot connection 86 permits fitting 84 to turn in the event that plunger 28 is struck by a seized valve operating arm 24.

Fitting 84 carries a plunger housing 88 in which the plunger 28 is positioned for horizontal movement along a line radial of the filling table. Plunger 28 preferably will be urged to the inner and dotted line position of Figure 1 by means of a spring such as provided in the structure shown in said Stewart and Bell patent.

At its outer end plunger 28 includes a horizontal stud 90 which is threaded into a block 92. Block 92 carries a link 94 at its outer end, link 94 being pivotally connected to block 92 by a horizontal pin 96 which extends across a vertical kerf 98 in block 92, so that the inner end of link 94 lies within the kerf. A pin 100 extends downwardly from the inner portion of link 94 and a spring 102 connects the outer end of pin 100 to a stud 104 on block 92. Spring 102 thus urges link 94 to the horizontal position illustrated and in which position a flat 106 on the inner end of the link will contact with the opposed surface of block 92.

As is best shown in Figure 2, block 94 extends through an aperture in the outer end of housing 88 and the side edges 107 of this aperture lie closely adjacent and are parallel to the side surfaces of block 92. By this arrangement, plunger 28 can be held against any tendency toward oscillation imparted thereto by a valve arm.

As is illustrated in Figure 1, the underside of link 94 is slotted or grooved as indicated at 108 and the upper end of the vertical arm 76 of bell crank 72 normally will be positioned in this groove. Thus, lever 72 and link 94 have a tongue and groove connection with each other. Because of this connection, if plunger 28 is struck by a seized valve operating arm 24, bracket 84 and housing 88 may swing about the pivot 86 without impedance from the arm 76 of bell crank 72.

The provision of the link 94 pivotally connected to block 92 enables plunger 28 to be disconnected from bell crank 72 by swinging link 94 upwardly on its pivot 96. When this has been done, the filling machine may be operated without bottles on the platforms 14 and the fact that the platforms may then raise to position R will not cause the plunger 28 to be retracted. As has been mentioned above, this type of operation frequently is desirable before beginning a run of filling.

The operation of the mechanism will be apparent from the opening portion of the specification as well as from the detailed discussion set forth in connection with the description of the detailed parts. In brief, if a platform 14 does not receive a bottle B or other container, the platform will rise to position R of Figure 1. As a result, the outer edge of the platform will contact with detector roller 22, thereby moving element 34 in a counterclockwise direction about its pivot 38 to the position illustrated in Figure 1 and against the action of spring 66. The resulting downward movement of link 52 will swing bell crank 72 in a counterclockwise direction about its pivot 78 to the position illustrated in Figure 1, thereby retracting the counterpressure plunger 28 from the dotted line position of Figure 1 to the solid line position of the same figure. Hence, when the valve arm 24 of the filling

head 18 corresponding to the platform 14 under discussion reaches plunger 28, plunger 28 will have been retracted and will not contact arm 24 to rotate it to counterpressure position CP. Thus, that arm 24 will move entirely below the filling trip 30 of Figure 2 instead of contacting with trip 30 to be moved to filling or liquid flow position F. Hence, no counterpressure or liquid will flow from the filling head 18. As soon as the platform 14 under discussion and raised to the extreme upper position R has moved out of contact with roller 22, spring 66 will restore the element 36 to normal position, thereby also lifting the link 52 and swinging bell crank to normal position. The spring within housing 88 as described in said Stewart and Bell patent will assist in this action and also will positively assure that counterpressure plunger 28 immediately will return to the dotted line position of Figure 1 in readiness to contact with the next valve arm 24 if the platform of that valve arm carries a bottle or other container.

If the filling machine superstructure is moved upwardly or downwardly to handle containers of greater or less height, it only will be necessary to move the bracket 82 in the proper direction and in accordance with usual practice. Such movement of the bracket 82 will be possible after the set screws 62 have been loosened with respect to link 52. When bracket 82 has been positioned at the proper height, the set screws 62 can be tightened again on link 52.

It will be observed that the present mechanism readily can be applied to a trip control mechanism of the type shown in said Stewart and Bell patent to convert the latter to mechanical operation. In more detail, a right-angled member can be secured to the outer end of the lower lever of the patented device to give it the form of the element 42, block 92 can be secured to the plunger of the patented device and the link 52 and bell crank 72 can be mounted and connected. With this done, and the roller 22 provided, a mechanical connection will be obtained between the trip plunger and lever of the patent.

The terminology used in the specification is for the purpose of description and not of limitation, the scope of the invention being indicated in the claims.

We claim:

1. The combination in a filling machine, of a base, a table rotatable in a horizontal plane relative to said base and including a plurality of filling heads and container supporting platforms, one of said platforms being below and vertically movable with respect to each of said filling heads, each of said filling heads including a filling valve rotatable about a horizontal axis extending radially of said table, said filling valves being provided with operating arms extending substantially radially of their axes, means to lift said platforms upwardly to bring the mouth of a container into engagement with one of said filling heads, said last-mentioned means being arranged to lift a platform to a higher position when no container is positioned thereon, a trip plunger positioned on said base along the path of travel of said operating arms with said table and movable horizontally and radially of the path of table movement, means to normally hold said trip plunger inwardly adjacent said table and in a position to contact with and move said arms, and means to move said trip plunger outwardly when a platform is lifted to said higher position and including a first lever pivoted on said base about a horizontal axis and having its inner end positioned to contact with a platform in said higher position, a second lever pivoted on said base about a horizontal axis, means connecting the outer ends of said levers, said second lever being operatively connected to said trip plunger to thereby move it outwardly upon contact of a container supporting platform with the inner end of said first lever.

2. A combination of the character described in claim 1 wherein said trip plunger is mounted on said base about

a vertical pivot and is releasable from said second lever upon movement about said pivot.

3. A combination of the character described in claim 1 wherein said trip plunger is mounted on said base about a vertical pivot and its outer end and said second lever have a tongue and groove connection to accommodate swinging movement of the trip about said vertical pivot.

4. A combination of the character described in claim 1 including a releasable connection between said trip plunger and said second lever.

5. A combination of the character described in claim 1 including means to hold said trip plunger against rotation about its longitudinal axis.

6. A combination of the character described in claim 1 wherein said means to connect said levers comprises a vertical link, and said first lever is a bellcrank movable about its horizontal axis and including a vertical arm and a horizontal arm, the latter being connected to said link.

7. A combination of the character described in claim 1 including a roller mounted on said first lever about a vertical axis and arranged to be engaged by a platform in said higher position.

8. A combination of the character described in claim 7 wherein said roller is adjustable in the direction of movement of said table.

9. The combination in a filling machine, of a base, a table rotatable in a horizontal plane relative to said base and including a plurality of filling heads and container supporting platforms, one of said platforms being below and vertically movable with respect to each of said filling heads, each of said filling heads including a filling valve rotatable about a horizontal axis extending radially of said table, said filling valves being provided with operating arms extending substantially radially of their axes, means to lift said platforms upwardly to bring the mouth of a container into engagement with one of said filling heads, said last-mentioned means being arranged

to lift a platform to a higher position when no container is positioned thereon, a trip plunger positioned on said base along the path of travel of said operating arms with said table and movable horizontally and radially of the path of table movement, means to normally hold said trip plunger inwardly adjacent said table and in a position to contact with and move said arms, and means to move said trip plunger outwardly when a platform is lifted to said higher position and including a vertically disposed element including a vertical leg and a horizontal leg and pivoted to said base on a horizontal axis with the upper portion of said vertical leg positioned to contact with a platform in said higher position, container supporting platform engaging means on the vertical leg of said element, a vertically disposed bellcrank pivoted to said base on a horizontal axis and above said element, said bellcrank including a vertical leg and a horizontal leg, a vertical link pivotally connecting the outer ends of the horizontal legs of said element and bellcrank, the vertical legs of said bellcrank being connected to said trip plunger to thereby move it outwardly upon contact of a container supporting platform with said platform engaging means.

10. A combination of the character described in claim 9 wherein said platform engaging means comprises a roller mounted on the upper portion of the vertical leg of said element, said roller being rotatable about a vertical axis, the pivot of said roller being adjustable horizontally with respect to said element.

References Cited in the file of this patent

UNITED STATES PATENTS

2,202,033	Stewart et al.	May 28, 1940
2,252,291	Dos Santos Mendonca et al.	Aug. 12, 1941
2,540,741	Krueger	Feb. 6, 1951